UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/482,956	01/14/2000	Mrudula Kanuri	95-309	7724

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MANELLI DENISON & SELTER
2000 M STREET NW SUITE 700
WASHINGTON, DC 20036-3307

EXAMINER
JAGANNATHAN, MELANIE

ART UNIT	PAPER NUMBER
2666	

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>*10 June 2005*</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

- Examiner withdraws finality of rejection mailed 4/26/2005 and regrets delay and

  any inconvenience.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

2.   Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Shani US 6,023,563 in view of Brady et al. US 5,914,938.

Regarding claims 1, 10, the claimed integrated network switch having a switching

module, configured for switching layer 2 packet within a network having a plurality of

subnetworks is disclosed by network switch (Figure 3, elements 3,4,5), in network with

plurality of LAN segments, receiving frame at one of its ports. See column 9, lines 3-19,

lines 58-60. The claimed obtaining, from layer 2 packet, layer 3 packet information

having a network identifier, subnetwork identifier and host identifier, the subnetwork

identifier identifying a corresponding one of the subnetworks and the host identifier

identifying a transmitting node having transmitted the layer 2 packet is disclosed by

network switch receiving frame on one of its ports and extracting network destination

address, MAC source address, network source address, and port number. See column

1, lines 37-48, column 9, lines 58-60, column 11, lines 26-27, lines 61-63.

The claimed storing address information from the layer 2 packet, including host

identifier, in a selected one of plurality of address tables within switching module based

on corresponding subnetwork identifier, each of the address tables configured for

storing the host identifiers of transmitting nodes of a corresponding one of subnetworks

is disclosed by network switch having network switch database made up of smaller

databases: main database, port-assignment database and router database storing port

numbers with VLAN and network/subnet information. Network switch extracts network

destination address, MAC source address, network source address, and port number

from incoming frame and as part of learning mode, correlates port number to VLAN

number and to network/subnet number in port assignment database (Tables 2a-2c).

See column 9, lines 58-60, column 10, lines 6-18, column 11, lines 26-27, lines 61-63.

Regarding claims 2, 5, 6, 11, the received data packet includes an IP header, the

storing step including storing the host identifier from IP header and layer 2 address

information from layer 2 packet into single table entry of selected one address table is

disclosed by IP network layer protocol and port assignment database storing port

number and VLAN numbers (Table 2a). See column 1, lines 37-48, column 2, lines 7-

10.

Regarding claims 3, 12, Shani discloses network switch (Figure 4, elements 3,

4,5) connected to VLAN segments spanning several ports and network switch receives

frame on one of its ports. See column 6, lines 53-57, column 9, lines 3-20, lines 42-45,

lines 58-60. However, Shani does not disclose selecting the one address table based

on the one network switch port having received the layer 2 packet. Brady et al.

discloses computer system (Figure 1, element 10) made up of virtual LANs (element

12). Each virtual LAN has a number of end stations (element 14) connected via virtual

LAN switches (element 16), the switches coupled via a high-speed backbone (element

18). Ethernet frames are transmitted across computer network. See column 4, lines 3-

27, lines 54-56. Each virtual LAN switch (Figure 1, element 16) includes a number of

port cards with forwarding table in storage device (Figure 2, element 32) in each port

card. See column 4, lines 29-53. At the time the invention was made it would have

been obvious to a person of ordinary skill in the art to modify Shani with port card

forwarding table in network switch as in Brady et al. One of ordinary skill in the art

would be motivated to do so for rapid access to forwarding tables to transmit the frames

to appropriate ports. See column 1, lines 66-67, column 2, lines 1-18.

Regarding claims 4, 13, Shani discloses all of the limitations of the claims except

for assigning each of the address tables to a corresponding one of the network switch

ports. Brady et al. discloses computer system (Figure 1, element 10) made up of virtual

LANs (element 12). Each virtual LAN has a number of end stations (element 14)

connected via virtual LAN switches (element 16), the switches coupled via a high-speed

backbone (element 18). Ethernet frames are transmitted across computer network.

See column 4, lines 3-27, lines 54-56. Each virtual LAN switch (Figure 1, element 16)

includes a number of port cards with forwarding table in storage device (Figure 2,

element 32) in each port card. See column 4, lines 29-53. At the time the invention

was made it would have been obvious to a person of ordinary skill in the art to modify

Shani with port card forwarding table in network switch as in Brady et al. One of

ordinary skill in the art would be motivated to do so for rapid access to forwarding tables

to transmit the frames to appropriate ports. See column 1, lines 66-67, column 2, lines

1-18.

Regarding claims 7-8, 14-15, Shani discloses network switch using port number

of incoming frame as key to search in port assignment database to find port's VLAN

number. See column 11, lines 61-65, column 12, lines 54-60. However, Shani does not

disclose the claimed searching for stored table entry by using the host identifier as a key

according to a linked list search, generating a hash key based on host identifier and

searching for stored table entry using generated hash key. Brady et al. discloses

source address lookups using source address and VLAN ID from frame and deriving a

search key using the source address and VLAN ID applied to a universal hash function

to get a bucket ID value which is used to locate appropriate address information in

bucket table. See column 5, lines 35-63. At the time the invention was made it would

have been obvious to a person of ordinary skill in the art to modify Shani with deriving of

hash key based on source address to locate address information from bucket table as in

Brady et al. One of ordinary skill in the art would be motivated to do so for rapid access

to forwarding tables and guaranteed search time regardless of bucket size. See column

2, lines 16-56.

Regarding claim 9, the claimed network switch is an integrated switch chip, the

searching step including searching selected one address table for switching layer 2

packet according to wire rate is disclosed by network switch featuring an ASIC design

thereby processing, modifying, transmitting and filtering frames at wire speed. See

column 6, lines 64-67.

Regarding claim 16, the claimed storing address information form layer 2 packet ,

including host identifier, in one selected address table based on a determined absence

of host identifier in one selected address table is disclosed by learning mode where

network switch correlates from incoming frame the port number to VLAN number and to

network/subnet number in port assignment database (Tables 2a-2c). See column 9,

lines 58-60, column 10, lines 6-18, column 11, lines 26-27, lines 61-63.

Regarding claims 17-18, 20, the claimed integrated network switch having

switching module configured for switching layer 2 data packet within a network at wire

rate is disclosed network switch featuring an ASIC design thereby processing,

modifying, transmitting and filtering frames at wire speed. See column 6, lines 64-67.

The claimed plurality of network switch ports is disclosed by network switch

including a plurality of ports. See column 6, lines 53-55, column 9, lines 58-60. The

claimed receiving, from layer 2 packet, layer 3 packet information having a network identifier, subnetwork identifier and host identifier, the subnetwork identifier identifying a corresponding one of the subnetworks and the host identifier identifying a transmitting node having transmitted the layer 2 packet is disclosed by network switch receiving frame on one of its ports and extracting network destination address, MAC source address, network source address, and port number. See column 1, lines 37-48, column 9, lines 58-60, column 11, lines 26-27, lines 61-63.

The claimed switching module configured for switching layer 2 packets between network switch ports according to layer 3 switching information, switching module including a plurality of address tables for storing layer 3 switching information for respective subnetworks is disclosed by network switching frames across VLAN segments (Figure 4) having 4 databases (Tables 1-4) for storing network/subnet numbers, VLAN numbers, port numbers. The claimed switching module accessing a selected one of the address tables based on subnetwork identifier is disclosed by network switch looks at incoming frame's network and subnet number and accesses the port assignment table. The claimed searching for the layer 3 switching information based on host identifier is disclosed by searching the port assignment table to extract all ports where similar networks or subnets connect and forwarding the incoming frame to those ports.

Regarding claim 19, Shani discloses network switch including databases (Tables 1-4) for storing network/subnet numbers, VLAN numbers, port numbers. Shani discloses network switch using port number of incoming frame as key to search in port

assignment database to find port's VLAN number. See column 11, lines 61-65, column

12, lines 54-60. Shani does not disclose searching each address table, based on host

identifier, using of one of a linked list search or hash key-based bin search.

Brady et al. discloses source address lookups using source address and VLAN

ID from frame and deriving a search key using the source address and VLAN ID applied

to a universal hash function to get a bucket ID value which is used to locate appropriate

address information in bucket table. See column 5, lines 35-63. At the time the

invention was made it would have been obvious to a person of ordinary skill in the art to

modify Shani with deriving of hash key based on source address to locate address

information from bucket table as in Brady et al. One of ordinary skill in the art would be

motivated to do so for rapid access to forwarding tables and guaranteed search time

regardless of bucket size. See column 2, lines 16-56.

Regarding claims 21-22, Shani discloses all of the limitations except for the

switching module accessing the selected one address table based on the one network

switch port having received the layer 2 packet and wherein each address table is

assigned to a corresponding one of the network switch ports. Brady et al. discloses

computer system (Figure 1, element 10) made up of virtual LANs (element 12). Each

virtual LAN has a number of end stations (element 14) connected via virtual LAN

switches (element 16), the switches coupled via a high-speed backbone (element 18).

Ethernet frames are transmitted across computer network. See column 4, lines 3-27,

lines 54-56. Each virtual LAN switch (Figure 1, element 16) includes a number of port

cards with forwarding table in storage device (Figure 2, element 32) in each port card.

See column 4, lines 29-53. At the time the invention was made it would have been obvious to a person of ordinary skill in the art to modify Shani with port card forwarding table in network switch as in Brady et al. One of ordinary skill in the art would be motivated to do so for rapid access to forwarding tables to transmit the frames to appropriate ports. See column 1, lines 66-67, column 2, lines 1-18.

Response to Arguments

3.   Applicant's arguments filed 6/10/2005, with respect to the rejection(s) of claim(s) 1-22 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made with Shani in view of Brady et al.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Gallo et al. US 6,907,469 disclose bridging and routing data frames via a network switch.

- Kadambi et al. US 6,104,696 disclose sending packets between trunk ports of network switches.

- Levenson et al. US 6,807,172 disclose learning and switching frames in a distributed network switch.

- Rodrig et al. US 6,256,314 disclose routerless layer 3 forwarding in a network.

- Ullum et al. US 6,266,705 disclose look up mechanism and associated hash table for a network switch.

- Hendel et al. US 6,088,356 disclose multi-layer network element.

- Zaumen et al. US 6,118,760 disclose management of entries in a network element forwarding memory.

- Yang et al. US 6,424,650 disclose network address filter device.

- O'Connell et al. US 6,661,787 disclose integrated data table in a network.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Jagannathan whose telephone number is 571-272-3163. The examiner can normally be reached on Monday-Friday from 8:00 a.m.-4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

FRANK DUONG
PRIMARY EXAMINER

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MJ
9/29/05